

FORM PTO-1390 (Modified)  
(REV 11-2000)

U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE

ATTORNEY'S DOCKET NUMBER

## TRANSMITTAL LETTER TO THE UNITED STATES

DESIGNATED/ELECTED OFFICE (DO/EO/US)

CONCERNING A FILING UNDER 35 U.S.C. 371

112740-394

U.S. APPLICATION NO. (IF KNOWN, SEE 37 CFR

10/019594

INTERNATIONAL APPLICATION NO.

PCT/EP00/05918✓

INTERNATIONAL FILING DATE

26 June 2000✓

PRIORITY DATE CLAIMED

25 June 1999✓

## TITLE OF INVENTION

SIMPLIFIED IMPLEMENTATION OF PROTOCOL MACHINES FOR PROTOCOLS WITH A LAYERED STRUCTURE

APPLICANT(S) FOR DO/EO/US

Schwarzbauer et al. Haus, Jürgen.

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. ☒ This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
2. ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.
3. ☒ This is an express request to begin national examination procedures (35 U.S.C. 371(f)). The submission must include items (5), (6), (9) and (24) indicated below.
4. ☒ The US has been elected by the expiration of 19 months from the priority date (Article 31).
5. ☒ A copy of the International Application as filed (35 U.S.C. 371 (c) (2))
  - a. ☒ is attached hereto (required only if not communicated by the International Bureau).
  - b. ☐ has been communicated by the International Bureau.
  - c. ☐ is not required, as the application was filed in the United States Receiving Office (RO/US).
6. ☒ An English language translation of the International Application as filed (35 U.S.C. 371(c)(2)).
  - a. ☒ is attached hereto.
  - b. ☐ has been previously submitted under 35 U.S.C. 154(d)(4).
7. ☒ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371 (c)(3))
  - a. ☐ are attached hereto (required only if not communicated by the International Bureau).
  - b. ☒ have been communicated by the International Bureau.
  - c. ☐ have not been made; however, the time limit for making such amendments has NOT expired.
  - d. ☐ have not been made and will not be made.
8. ☒ An English language translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).
9. ☒ An oath or declaration of the inventor(s) (35 U.S.C. 371 (c)(4)).
10. ☐ An English language translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371 (c)(5)).
11. ☒ A copy of the International Preliminary Examination Report (PCT/IPEA/409).
12. ☒ A copy of the International Search Report (PCT/ISA/210).

## Items 13 to 20 below concern document(s) or information included:

13. ☒ An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
14. ☒ An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
15. ☒ A **FIRST** preliminary amendment.
16. ☐ A **SECOND** or **SUBSEQUENT** preliminary amendment.
17. ☒ A substitute specification.
18. ☐ A change of power of attorney and/or address letter.
19. ☐ A computer-readable form of the sequence listing in accordance with PCT Rule 13ter.2 and 35 U.S.C. 1.821 - 1.825
20. ☐ A second copy of the published international application under 35 U.S.C. 154(d)(4).
21. ☐ A second copy of the English language translation of the international application under 35 U.S.C. 154(d)(4).
22. ☒ Certificate of Mailing by Express Mail
23. ☐ Other items or information:

|   |  |   |
|---|--|---|
| U.S. APPLICATION NO. (IF KNOWN, SEE 37 CFR 1.101)<br><b>10/019594</b> | INTERNATIONAL APPLICATION NO.<br><b>PCT/EP00/05918</b> | ATTORNEY'S DOCKET NUMBER<br><b>112740-394</b> |
|---|--|---|

24. The following fees are submitted:

**BASIC NATIONAL FEE ( 37 CFR 1.492 (a) (1) - (5) ) :**

- |  |                  |
|--|------------------|
| <input type="checkbox"/> Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO and International Search Report not prepared by the EPO or JPO ..... | <b>\$1040.00</b> |
| <input checked="" type="checkbox"/> International preliminary examination fee (37 CFR 1.482) not paid to USPTO but International Search Report prepared by the EPO or JPO .....  | <b>\$890.00</b>  |
| <input type="checkbox"/> International preliminary examination fee (37 CFR 1.482) not paid to USPTO but international search fee (37 CFR 1.445(a)(2)) paid to USPTO .....  | <b>\$740.00</b>  |
| <input type="checkbox"/> International preliminary examination fee (37 CFR 1.482) paid to USPTO but all claims did not satisfy provisions of PCT Article 33(1)-(4) .....   | <b>\$710.00</b>  |
| <input type="checkbox"/> International preliminary examination fee (37 CFR 1.482) paid to USPTO and all claims satisfied provisions of PCT Article 33(1)-(4) .....   | <b>\$100.00</b>  |

**ENTER APPROPRIATE BASIC FEE AMOUNT =****\$890.00**
 Surcharge of **\$130.00** for furnishing the oath or declaration later than ☐ 20 ☐ 30 months from the earliest claimed priority date (37 CFR 1.492 (e)).
**\$0.00**

| CLAIMS             | NUMBER FILED | NUMBER EXTRA | RATE      |  |               |
|--------------------|--------------|--------------|-----------|--|---------------|
| Total claims       | 4 - 20 =     | 0            | x \$18.00 |  | <b>\$0.00</b> |
| Independent claims | 1 - 3 =      | 0            | x \$84.00 |  | <b>\$0.00</b> |

Multiple Dependent Claims (check if applicable). ☐**\$0.00****TOTAL OF ABOVE CALCULATIONS =****\$890.00**☐ Applicant claims small entity status. See 37 CFR 1.27). The fees indicated above are reduced by 1/2.**\$0.00****SUBTOTAL =****\$890.00**
 Processing fee of **\$130.00** for furnishing the English translation later than ☐ 20 ☐ 30 months from the earliest claimed priority date (37 CFR 1.492 (f)).
**\$0.00****TOTAL NATIONAL FEE =****\$890.00**
 Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31) (check if applicable). ☐
**\$0.00****TOTAL FEES ENCLOSED =****\$890.00**

|                      |           |
|----------------------|-----------|
| <b>Amount to be:</b> |           |
| <b>refunded</b>      | <b>\$</b> |
| <b>charged</b>       | <b>\$</b> |

- a. ☒ A check in the amount of **\$890.00** to cover the above fees is enclosed.
- b. ☐ Please charge my Deposit Account No. \_\_\_\_\_ in the amount of \_\_\_\_\_ to cover the above fees. A duplicate copy of this sheet is enclosed.
- c. ☒ The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. **02-1818**. A duplicate copy of this sheet is enclosed.
- d. ☐ Fees are to be charged to a credit card. **WARNING:** Information on this form may become public. **Credit card information should not be included on this form.** Provide credit card information and authorization on PTO-2038.

**NOTE:** Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.

SEND ALL CORRESPONDENCE TO:

 William E. Vaughan (Reg. No. 39,056)  
 Bell, Boyd & Lloyd LLC  
 P.O. Box 1135  
 Chicago, Illinois 60690-1135

SIGNATURE

William E. Vaughan

NAME

**39,056**

REGISTRATION NUMBER

**December 26, 2001**

DATE

581 PCT/PTO 23 DEC 2001

BOX PCT

IN THE UNITED STATES ELECTED/DESIGNATED OFFICE  
OF THE UNITED STATES PATENT AND TRADEMARK OFFICE  
UNDER THE PATENT COOPERATION TREATY-CHAPTER II

5

**PRELIMINARY AMENDMENT**

APPLICANTS: Schwarzbauer et al. DOCKET NO: 112740-394

SERIAL NO: GROUP ART UNIT:

EXAMINER:

INTERNATIONAL APPLICATION NO: PCT/EP00/05918

10 INTERNATIONAL FILING DATE: 26 June 2000

INVENTION: SIMPLIFIED IMPLEMENTATION OF PROTOCOL  
MACHINES FOR PROTOCOLS WITH A LAYERED  
STRUCTURE15 Assistant Commissioner for Patents,  
Washington, D.C. 20231

Sir:

Please amend the above-identified International Application before entry  
20 into the National stage before the U.S. Patent and Trademark Office under 35  
U.S.C. §371 as follows:**In the Specification:**Please replace the Specification of the present application, including the  
Abstract, with the following Substitute Specification:

25

## S P E C I F I C A T I O N

## TITLE OF THE INVENTION

SIMPLIFIED IMPLEMENTATION OF PROTOCOL MACHINES FOR  
PROTOCOLS WITH A LAYERED STRUCTUREThe present invention relates to a protocol machine, which handles  
30 messages using a protocol which includes the functionality for complete, sequence-  
protected transmission of messages, with the protocol having a layer structure for  
complete, sequence-protected transmission.

Protected, that is to say complete and sequence-protected transmission, is made possible by many communication protocols. In this context, complete transmission refers to all messages transmitted being received. The order of the reception is of no importance here. Furthermore, sequence-protected transmission  
5 refers to the messages being received in the order in which they have been transmitted. Loss of messages is permissible. It is advantageous to split a protocol, which guarantees complete and sequence-protected transmission, into two sublayers: one sublayer implements the complete transmission; a sublayer below that then implements the sequence-protected transmission on the basis of the  
10 complete transmission. This structure is shown in Figure 1.

The messages carrying user data are also structured in accordance with the structure of the protocol machines. This structure is shown in Figure 2. In the message format, there is a sequence number for sublayer 1 which provides complete transmission. To solve the problem of head-of-line blocking, protocols  
15 having a layered structure are based on there being a number of message streams which do not mutually influence one another. To identify its association with a message stream, each message contains an identifier of the message stream to which the message belongs. Finally, each message also contains another number for sequence protection within a message stream. These two data items are used by  
20 sublayer 2 for transferring the user data to the user of the protocol in the correct order. Furthermore, there is a message stream which plays a special role in as much as the messages are not transmitted sequence-protected in it, that is to say it is not processed by sublayer 2. Examples of these structures are, e.g., MDTP which is currently being standardized at the IETF, and MSSCOP (to be called SSCOPMCE  
25 in future) which is currently being standardized at the ITU. A further example of such a structure can be found in US patent 4,703,475.

However, there are applications in which only complete transmission is needed. For this purpose, protocols could be developed which do exactly this. In practice, however, this is not done but existing protocols are used for protected  
30 transmission. As a result, the protocol machines used do more than is required. It is, therefore, advantageous to implement simplified versions of protocol machines

which only guarantee complete transmission and still conform to the protocol. As a result, they can communicate with protocol machines which implement the entire protocol.

5 In most cases, established protocols previously have been used for protected transmission. Special protocols also may be used which only provide for complete transmission.

### SUMMARY OF THE INVENTION

A major aspect of the present invention is that the protocol machine, for processing the messages, uses only the functions of the complete transmission of the protocol in conformance with the protocol. The solution specified here allows the implementation of protocol machines for protocols having a layered structure to be considerably simplified if only the complete transmission is needed as function of the protocol. As such, the implementation consists of fewer lines of source code and considerably less resources (storage space, CPU power) are needed at run time. 10 It will be shown that an implementation can even be achieved in such a manner that it can cooperate without problems with protocol machines which use all of the functions of the protocol. For this purpose, the functions of the protocol machine are restricted in such a manner that, apart from the message stream which assumes the special role, no others can be used. However, this requires that the protocol 15 contains the required elements for rejecting unwanted messages. This is provided in MDTP and MSSCOP. 20

A special feature of the present invention lies in the recognition that, for the complete transmission of information, protocols having a layout structure can be used which actually guarantee protected transmission without needing to 25 implement the functions necessary for sequence protection in the protocol machines.

Additional features and advantages of the present invention are described in, and will be apparent from, the following Detailed Description of the Invention and the Figures.

## BRIEF DESCRIPTION OF THE FIGURES

Figure 1 shows a protocol, which guarantees complete and sequence-protected transmission, split into two sublayers.

Figure 2 shows messages structured in accordance with the structure of a  
5 protocol machine.

## DETAILED DESCRIPTION OF THE INVENTION

The exemplary embodiment to be provided here is a simplified implementation of a protocol machine for the MDTP protocol which is currently being discussed in its version 5 at the IETF. However, the possibility of rejecting a  
10 stream initiation (stream initiation NAK) is already being used here which will only be contained in version 6 of the protocol. It is also assumed that stream 0, a stream having a special role, is modified to the extent that all data parts with stream identifier 0 carry the sequence number 0. As such, that no sequence-protected transmission is possible in stream 0.

15 On the basis of these assumptions, a simplified implementation will be described in comparison with a complete implementation. A complete reference implementation of MDTP will be available shortly.

Firstly, the performance during the processing of received control parts (message components for stream management) will be described:

20 All control parts apart from the stream initiation message are dealt with as in the case of a full implementation. The simplified implementation responds to a stream initiation by sending a corresponding stream initiation Nak. All other messages relating to stream management (stream initiation Ack, stream termination, stream termination Ack) are discarded in conformance with the  
25 protocol.

The performance in processing data parts does not differ from the standard: with the circumstances given here, this refers to data parts being discarded, the stream identifier of which is not equal to 0 or the sequence number of which is not equal to 0.

30 The differences in coding the protocol machines are essentially as follows:

in the simplified implementation, the treatment of the stream management messages is trivial: either a message is send out (stream initiation Nak) or the received message is discarded. This essentially saves having to code the treatment of these messages and completely the monitoring of the transmission of these  
5 messages. Furthermore, the code responsible for sequence protection within a stream does not need to be implemented. Furthermore, the complete receive buffer, which is needed for sequence protection and may have to be very large since the size of the data parts is only restricted by the size of the UDP datagrams (approx. 64 kB), can be dispensed with. In the simplified implementation, this  
10 saves some of the code and the essential part of the memory needed for the implementation.

Although the present invention has been described with reference to specific embodiments, those of skill in the art will recognize that changes may be made thereto without departing from the spirit and scope of the invention as set  
15 forth in the hereafter appended claims.

## ABSTRACT OF THE DISCLOSURE

Simplified implementation of protocol machines for protocols having a layered structure, wherein the simplified protocol machine which uses the above protocols in conformance with the protocol to provide for only complete transmission.



**In the Claims:**

On page 6, cancel line 1 and substitute the following left-hand justified heading therefor:

**CLAIMS**

5 Please cancel claims 1-4, without prejudice, and substitute the following claims therefor:

10 5. A protocol machine for processing messages, comprising a protocol which is used by the protocol machine for the processing of messages, the protocol including functions for complete and sequence-protected transmission of messages and having a layered structure with respect to the complete and sequence-protected transmission, wherein the protocol machine only uses the functions for complete transmission of the protocol in conformance with the protocol.

15 6. A protocol machine as claimed in claim 5, wherein the functions of the protocol machine are restricted such that only a message stream in which the messages are not transmitted sequence-protected can be used for transmitting messages with the aid of the protocol.

20 7. A protocol machine as claimed in claim 5, wherein the protocol is MDTP.

8. A protocol machine as claimed in claim 5, wherein the protocol is MSSCOP.

**REMARKS**

25 The present amendment makes editorial changes and corrects typographical errors in the specification, which includes the Abstract, in order to conform the specification to the requirements of United States Patent Practice. No new matter is added thereby.

30 Attached hereto is a marked-up version of the changes made to the specification and claims by the current amendment. The attached page is captioned **"Versions with Markings to Show Changes Made."**

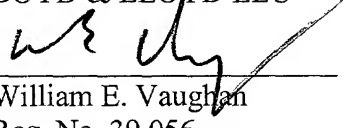
In addition, the present amendment cancels original claims 1-4 in favor of new claims 5-8. Claims 5-8 have been presented solely because the revisions by crossing out underlining which would have been necessary in claims 1-4 in order to present those claims in accordance with preferred United States Patent Practice would have been too extensive, and thus would have been too burdensome. The present amendment is intended for clarification purposes only and not for substantial reasons related to patentability pursuant to 35 U.S.C. §§101, 102, 103 or 112. Indeed, the cancellation of claims 1-4 does not constitute an intent on the part of the Applicants to surrender any of the subject matter of claims 1-4.

Early consideration on the merits is respectfully requested.

Respectfully submitted,

BELL, BOYD & LLOYD LLC

BY

  
\_\_\_\_\_  
William E. Vaughan  
Reg. No. 39,056  
P.O. Box 1135  
Chicago, Illinois 60690-1135  
Phone: (312) 807-4292

VERSION WITH MARKINGS TO SHOW CHANGES MADE

In the Specification:

Description

SPECIFICATION

5

TITLE OF THE INVENTION

SIMPLIFIED IMPLEMENTATION OF PROTOCOL MACHINES FOR  
PROTOCOLS WITH A LAYERED STRUCTURE

BACKGROUND OF THE INVENTION

The present invention relates to a protocol machine, which handles  
10 messages using a protocol which ~~comprises~~ includes the functionality for complete,  
sequence-protected transmission of messages, with the protocol having a layer  
structure for complete, sequence-protected transmission.

Protected, that is to say complete and sequence-protected transmission, is  
made possible by many communication protocols. In this context, complete  
15 transmission ~~means that~~ refers to all messages transmitted ~~are being~~ received. The  
order of the reception is of no importance here. Furthermore, sequence-protected  
transmission ~~means that~~ refers to the messages ~~are being~~ received in the order in  
which they have been transmitted. Loss of messages is permissible. It is of  
~~advantage~~ advantageous to split a protocol, which guarantees complete and  
20 sequence-protected transmission, into two sublayers: one sublayer implements the  
complete transmission; a sublayer below that then implements the sequence-  
protected transmission on the basis of the complete transmission. This structure is  
shown in ~~figure~~ Figure 1.

The messages carrying user data are also structured in accordance with the  
25 structure of the protocol machines. This structure is shown in ~~figure~~ Figure 2. In the  
message format, there is a sequence number for sublayer 1 which provides  
complete transmission. To solve the problem of head-of-line blocking, protocols  
having a layered structure are based on there being a number of message streams  
which do not mutually influence one another. To identify its association with a  
30 message stream, each message contains an identifier of the message stream to  
which the message belongs. Finally, each message also contains another number

for sequence protection within a message stream. These two data items are used by sublayer 2 for transferring the user data to the user of the protocol in the correct order. Furthermore, there is a message stream which plays a special role in as much as the messages are not transmitted sequence-protected in it, that is to say it is not  
5 processed by sublayer 2. Examples of these structures are, e.g., MDTP which is currently being standardized at the IETF, and MSSCOP (to be called SSCOPMCE in future) which is currently being standardized at the ITU. A further example of such a structure can be found in US patent 4,703,475.

However, there are applications in which only complete transmission is  
10 needed. For this purpose, protocols could be developed which do exactly this. In practice, however, this is not done but existing protocols are used for protected transmission. As a result, the protocol machines used do more than is required. It is, therefore, advantageous to implement simplified versions of protocol machines which only guarantee complete transmission and still conform to the protocol. As a  
15 result, they can communicate with protocol machines which implement the entire protocol.

In most cases, established protocols ~~have~~ previously have been used for protected transmission. Special protocols ~~may~~ also may be used which only provide for complete transmission.

## 20 SUMMARY OF THE INVENTION

The A major aspect of the present invention is that the protocol machine, for processing the messages, uses only the functions of the complete transmission of ~~said~~ the protocol in conformance with the protocol. The solution specified here allows the implementation of protocol machines for protocols having a layered  
25 structure to be considerably simplified if only the complete transmission is needed as function of the protocol. ~~This means not only that~~ As such, the implementation consists of fewer lines of source code ~~but also that~~ and considerably less resources (storage space, CPU power) are needed at run time. It will be shown that an implementation can even be achieved in such a manner that it can cooperate  
30 without problems with protocol machines which use all of the functions of the protocol. For this purpose, the functions of the protocol machine are restricted in

such a manner that, apart from the message stream which assumes the special role, no others can be used. However, this requires that the protocol contains the required elements for rejecting unwanted messages. This is provided in MDTP and MSSCOP.

5           A special feature of the present invention ~~relies~~ lies in the recognition that, for the complete transmission of information, protocols having a layout structure can be used which actually guarantee protected transmission without needing to implement the functions necessary for sequence protection in the protocol machines.

10           Additional features and advantages of the present invention are described in, and will be apparent from, the following Detailed Description of the Invention and the Figures.

#### BRIEF DESCRIPTION OF THE FIGURES

15           Figure 1 shows a protocol, which guarantees complete and sequence-protected transmission, split into two sublayers.

Figure 2 shows messages structured in accordance with the structure of a protocol machine.

#### DETAILED DESCRIPTION OF THE INVENTION

20           The exemplary embodiment to be provided here is a simplified implementation of a protocol machine for the MDTP protocol which is currently being discussed in its version 5 at the IETF. However, the possibility of rejecting a stream initiation (stream initiation NAK) is already being used here which will only be contained in version 6 of the protocol. It is also assumed that stream 0, a stream having a special role, is modified to the extent that all data parts with stream  
25   identifier 0 carry the sequence number 0. ~~This means~~ As such, that no sequence-protected transmission is possible in stream 0.

            On the basis of these assumptions, a simplified

implementation will be described in comparison with a complete implementation.  
A complete reference implementation of MDTP will be available shortly.

Firstly, the performance during the processing of received control parts  
(message components for stream management) will be described:

5 All control parts apart from the stream initiation message are dealt with as  
in the case of a full implementation. The simplified implementation responds to a  
stream initiation by sending a corresponding stream initiation Nak. All other  
messages relating to stream management (stream initiation Ack, stream  
termination, stream termination Ack) are discarded in conformance with the  
10 protocol.

The performance in processing data parts does not differ from the standard:  
with the circumstances given here, this ~~means that~~ refers to data parts are being  
discarded, the stream identifier of which is not equal to 0 or the sequence number  
of which is not equal to 0.

15 The differences in coding the protocol machines are essentially as follows:  
in the simplified implementation, the treatment of the stream management  
messages is trivial: either a message is send out (stream initiation Nak) or the  
received message is discarded. This essentially saves having to code the treatment  
of these messages and completely the monitoring of the transmission of these  
20 messages. Furthermore, the code responsible for sequence protection within a  
stream does not need to be implemented. Furthermore, the complete receive buffer,  
which is needed for sequence protection and may have to be very large since the  
size of the data parts is only restricted by the size of the UPD datagrams  
(approx. 64 kB), can be dispensed with. In the simplified implementation, this  
25 saves some of the code and the essential part of the memory needed for the  
implementation.

Although the present invention has been described with reference to  
specific embodiments, those of skill in the art will recognize that changes may be  
made thereto without departing from the spirit and scope of the invention as set  
30 forth in the hereafter appended claims.

Abstract

ABSTRACT OF THE DISCLOSURE

Simplified implementation of protocol machines for protocols having a layered structure, wherein the ~~The protected, that is to say complete and sequence-protected transmission is made possible by many communication protocols.~~ However, there are applications in which only complete transmission is needed. The invention discloses a simplified protocol machine which uses the above protocols in conformance with the protocol to provide for only complete transmission.

Figure 1

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ART 34 AMDT

## Description

Simplified implementation of protocol machines for protocols with a layered structure

5

The invention relates to a protocol machine, which handles messages using a protocol which comprises the functionality for complete, sequence-protected transmission of messages, with the protocol having a layer structure for complete, sequence-protected transmission.

Protected, that is to say complete and sequence-protected transmission is made possible by many communication protocols. In this context, complete transmission means that all messages transmitted are received. The order of the reception is of no importance here. Furthermore, sequence-protected transmission means that the messages are received in the order in which they have been transmitted. Loss of messages is permissible. It is of advantage to split a protocol, which guarantees complete and sequence-protected transmission, into two sublayers: one sublayer implements the complete transmission; a sublayer below that then implements the sequence-protected transmission on the basis of the complete transmission. This structure is shown in figure 1.

The messages carrying user data are also structured in accordance with the structure of the protocol machines. This structure is shown in figure 2. In the message format, there is a sequence number for sublayer 1 which provides complete transmission. To solve the problem of head-of-line blocking, protocols having a layered structure are based on there being a number of message streams which do not mutually influence one another. To identify its association with a message stream, each

AMENDED SHEET



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- 1a -

message contains an identifier of the message stream  
to which

the message belongs. Finally, each message also contains another number for sequence protection within a message stream. These two data items are used by sublayer 2 for transferring the user data to the user of the protocol in the correct order. Furthermore, there is a message stream which plays a special role in as much as the messages are not transmitted sequence-protected in it, that is to say it is not processed by sublayer 2. Examples of these structures are, e.g., MDTP which is currently being standardized at the IETF, and MSSCOP (to be called SSCOPMCE in future) which is currently being standardized at the ITU. A further example of such a structure can be found in US patent 4,703,475.

However, there are applications in which only complete transmission is needed. For this purpose, protocols could be developed which do exactly this. In practice, however, this is not done but existing protocols are used for protected transmission. As a result, the protocol machines used do more than is required. It is, therefore, advantageous to implement simplified versions of protocol machines which only guarantee complete transmission and still conform to the protocol. As a result, they can communicate with protocol machines which implement the entire protocol.

In most cases, established protocols have previously been used for protected transmission. Special protocols may also be used which only provide for complete transmission.

The major aspect of the present invention is that the protocol machine, for processing the messages, uses only the functions of the complete transmission of said protocol in conformance with the protocol. The solution specified here allows the implementation of protocol machines for protocols having a layered structure

to be considerably simplified if only the complete transmission is needed as function of the protocol. This means not only that the implementation consists of fewer lines of source code but also that considerably less resources (storage space, CPU power) are needed at run time. It will be shown that an implementation can even be achieved in such a manner that it can cooperate without problems with protocol machines which use all of the functions of the protocol. For this purpose, the functions of the protocol machine are restricted in such a manner that, apart from the message stream which assumes the special role, no others can be used. However, this requires that the protocol contains the required elements for rejecting unwanted messages. This is provided in MDTP and MSSCOP.

A special feature of the invention relies in the recognition that, for the complete transmission of information, protocols having a layout structure can be used which actually guarantee protected transmission without needing to implement the functions necessary for sequence protection in the protocol machines.

The exemplary embodiment to be provided here is a simplified implementation of a protocol machine for the MDTP protocol which is currently being discussed in its version 5 at the IETF. However, the possibility of rejecting a stream initiation (stream initiation NAK) is already being used here which will only be contained in version 6 of the protocol. It is also assumed that stream 0, a stream having a special role, is modified to the extent that all data parts with stream identifier 0 carry the sequence number 0. This means that no sequence-protected transmission is possible in stream 0.

On the basis of these assumptions a simplified

implementation will be described in comparison with a  
complete

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implementation. A complete reference implementation of MDTP will be available shortly.

5 Firstly, the performance during the processing of received control parts (message components for stream management) will be described:

10 All control parts apart from the stream initiation message are dealt with as in the case of a full implementation. The simplified implementation responds to a stream initiation by sending a corresponding stream initiation Nak. All other messages relating to stream management (stream initiation Ack, stream termination, stream termination Ack) are discarded in  
15 conformance with the protocol.

The performance in processing data parts does not differ from the standard:  
20 with the circumstances given here, this means that data parts are discarded the stream identifier of which is not equal to 0 or the sequence number of which is not equal to 0.

25 The differences in coding the protocol machines are essentially as follows:  
in the simplified implementation, the treatment of the stream management messages is trivial: either a message is send out (stream initiation Nak) or the received message is discarded. This essentially saves having to  
30 code the treatment of these messages and completely the monitoring of the transmission of these messages. Furthermore, the code responsible for sequence protection within a stream does not need to be implemented. Furthermore, the complete receive buffer,  
35 which is needed for sequence protection and may have to be very large since the size of the data parts is only

- 4a -

restricted by the size of the UPD datagrams (approx. 64 kB), can be dispensed with. In the simplified implementation, this saves some of the

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code and the essential part of the memory needed for the implementation.

FOOTNOTES

## Patent Claims

1. A protocol machine which uses for the processing  
of messages a protocol which comprises the  
5 functions for complete and sequence-protected  
transmission of messages, the protocol exhibiting  
a layered structure with respect to the complete  
and sequence-protected transmission, characterized  
in that the protocol machine for processing the  
10 messages only using the functions of complete  
transmission of said protocol in conformance with  
the protocol.
2. The protocol machine as claimed in claim 1,  
15 characterized in that the functions of the  
protocol machine are restricted in such a manner  
that only the message stream in which the messages  
are not transmitted sequence-protected can be used  
for transmitting messages with the aid of the  
20 protocol.
3. The protocol machine as claimed in claim 1 or 2,  
characterized in that said protocol is the MDTP.
- 25 4. The protocol machine as claimed in claim 1 or 2,  
characterized in that said protocol is the MSSCOP.



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FIGURE 1

**Abbildung 1**

STRUCTURE OF PROTOCOL MACHINES

**Struktur von Protokollmaschinen****für geschichtete Protokolle**

FOR LAYERED PROTOCOLS

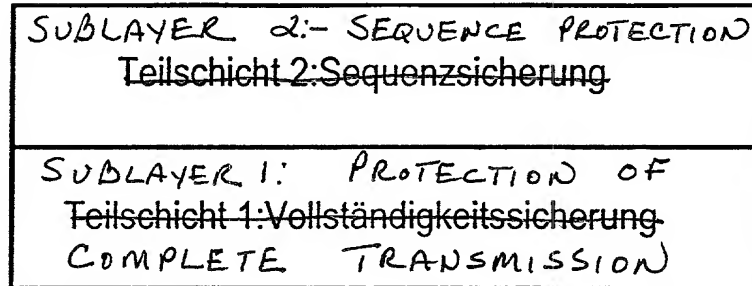


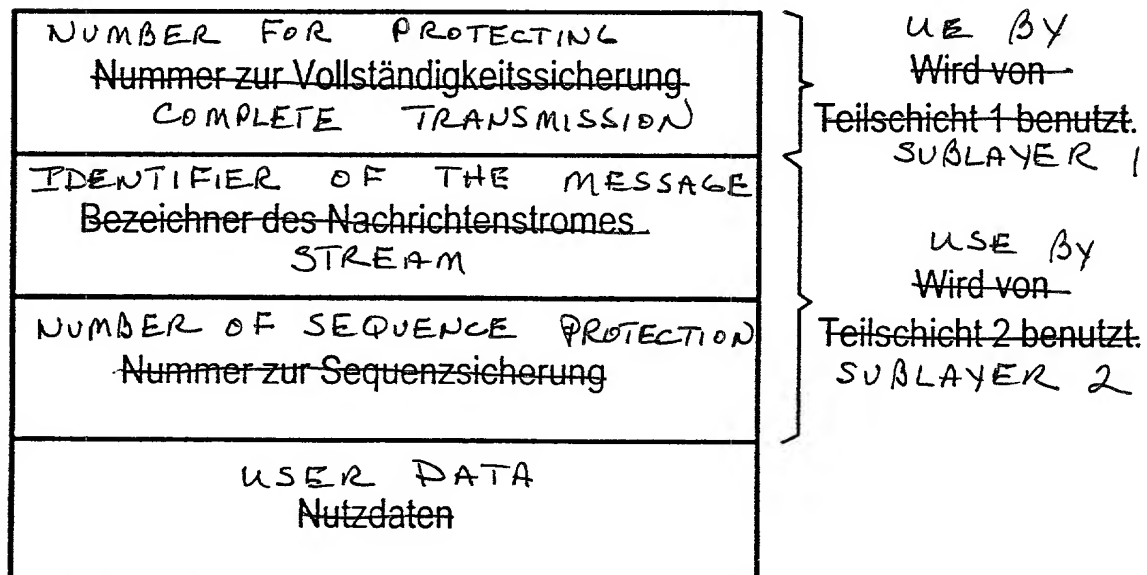
FIGURE 2

**Abbildung 2**

STRUCTURE OF MESSAGE FORMATS OF

**Struktur der Nachrichtenformate von****Nutzdaten bei geschichteten Protokollen**

USER DATA WITH LAYERED PROTOCOLS



# Declaration and Power of Attorney For Patent Application

## Erklärung Für Patentanmeldungen Mit Vollmacht

### German Language Declaration

Als nachstehend benannter Erfinder erkläre ich hiermit an Eides Statt:

As a below named inventor, I hereby declare that:

dass mein Wohnsitz, meine Postanschrift, und meine Staatsangehörigkeit den im Nachstehenden nach meinem Namen aufgeführten Angaben entsprechen,

My residence, post office address and citizenship are as stated below next to my name,

dass ich, nach bestem Wissen der ursprüngliche, erste und alleinige Erfinder (falls nachstehend nur ein Name angegeben ist) oder ein ursprünglicher, erster und Miterfinder (falls nachstehend mehrere Namen aufgeführt sind) des Gegenstandes bin, für den dieser Antrag gestellt wird und für den ein Patent beantragt wird für die Erfindung mit dem Titel:

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled

Vereinfachte Implementation von  
Protokollmaschinen für Protokolle mit  
Schichtenstruktur

Simplified implementation of protocol  
machines for protocols with a stratified  
structure ✓

deren Beschreibung

the specification of which

(zutreffendes ankreuzen)

(check one)

☐ hier beigefügt ist.

☐ is attached hereto.

☒ am 26.06.2000 als

☒ was filed on 26.06.2000 as

PCT internationale Anmeldung

PCT international application

PCT Anmeldungsnummer PCT/EP00/05918

PCT Application No. PCT/EP00/05918 ✓

eingereicht wurde und am \_\_\_\_\_

and was amended on \_\_\_\_\_

abgeändert wurde (falls tatsächlich abgeändert).

(if applicable)

Ich bestätige hiermit, dass ich den Inhalt der obigen Patentanmeldung einschliesslich der Ansprüche durchgesehen und verstanden habe, die eventuell durch einen Zusatzantrag wie oben erwähnt abgeändert wurde.

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims as amended by any amendment referred to above.

Ich erkenne meine Pflicht zur Offenbarung irgendwelcher Informationen, die für die Prüfung der vorliegenden Anmeldung in Einklang mit Absatz 37, Bundesgesetzbuch, Paragraph 1.56(a) von Wichtigkeit sind, an.

I acknowledge the duty to disclose information which is material to the examination of this application in accordance with Title 37, Code of Federal Regulations, §1.56(a).

Ich beanspruche hiermit ausländische Prioritätsvorteile gemäss Abschnitt 35 der Zivilprozessordnung der Vereinigten Staaten, Paragraph 119 aller unten angegebenen Auslandsanmeldungen für ein Patent oder eine Erfindersurkunde, und habe auch alle Auslandsanmeldungen für ein Patent oder eine Erfindersurkunde nachstehend gekennzeichnet, die ein Anmeldedatum haben, das vor dem Anmeldedatum der Anmeldung liegt, für die Priorität beansprucht wird.

I hereby claim foreign priority benefits under Title 35, United States Code, §119 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

# German Language Declaration

Prior foreign applications  
Priorität beansprucht

Priority Claimed

19929170.5 ✓ DE ✓  
(Number) (Country)  
(Nummer) (Land)

25.06.1999 ✓  
(Day Month Year Filed)  
(Tag Monat Jahr eingereicht)

☒ ☐  
Yes No  
Ja Nein

(Number) (Country)  
(Nummer) (Land)

(Day Month Year Filed)  
(Tag Monat Jahr eingereicht)

☐ ☐  
Yes No  
Ja Nein

(Number) (Country)  
(Nummer) (Land)

(Day Month Year Filed)  
(Tag Monat Jahr eingereicht)

☐ ☐  
Yes No  
Ja Nein

Ich beanspruche hiermit gemäss Absatz 35 der Zivilprozessordnung der Vereinigten Staaten, Paragraph 120, den Vorzug aller unten aufgeführten Anmeldungen und falls der Gegenstand aus jedem Anspruch dieser Anmeldung nicht in einer früheren amerikanischen Patentanmeldung laut dem ersten Paragraphen des Absatzes 35 der Zivilprozessordnung der Vereinigten Staaten, Paragraph 122 offenbart ist, erkenne ich gemäss Absatz 37, Bundesgesetzbuch, Paragraph 1.56(a) meine Pflicht zur Offenbarung von Informationen an, die zwischen dem Anmeldedatum der früheren Anmeldung und dem nationalen oder PCT internationalen Anmeldedatum dieser Anmeldung bekannt geworden sind.

I hereby claim the benefit under Title 35, United States Code, §120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, §122, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, §1.56(a) which occurred between the filing date of the prior application and the national or PCT international filing date of this application.

PCT/EP00/05918 ✓  
(Application Serial No.)  
(Anmeldeseriennummer)

26.06.2000 ✓  
(Filing Date D, M, Y)  
(Anmeldedatum T, M, J)

anhängig  
(Status)  
(patentiert, anhängig,  
aufgegeben)

pending  
(Status)  
(patented, pending,  
abandoned)

(Application Serial No.)  
(Anmeldeseriennummer)

(Filing Date D,M,Y)  
(Anmeldedatum T, M; J)

(Status)  
(patentiert, anhängig,  
aufgeben)

(Status)  
(patented, pending,  
abandoned)

Ich erkläre hiermit, dass alle von mir in der vorliegenden Erklärung gemachten Angaben nach meinem besten Wissen und Gewissen der vollen Wahrheit entsprechen, und dass ich diese eidesstattliche Erklärung in Kenntnis dessen abgebe, dass wissentlich und vorsätzlich falsche Angaben gemäss Paragraph 1001, Absatz 18 der Zivilprozessordnung der Vereinigten Staaten von Amerika mit Geldstrafe belegt und/oder Gefängnis bestraft werden koennen, und dass derartig wissentlich und vorsätzlich falsche Angaben die Gültigkeit der vorliegenden Patentanmeldung oder eines darauf erteilten Patentes gefährden können.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true, and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

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# German Language Declaration

VERTRETUNGSVOLLMACHT: Als benannter Erfinder beauftrage ich hiermit den nachstehend benannten Patentanwalt (oder die nachstehend benannten Patentanwälte) und/oder Patent-Agenten mit der Verfolgung der vorliegenden Patentanmeldung sowie mit der Abwicklung aller damit verbundenen Geschäfte vor dem Patent- und Warenzeichenamt: (Name und Registrationsnummer anführen)

POWER OF ATTORNEY: As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith. (list name and registration number)



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|  |                           |   |                          |
|--|---------------------------|---|--------------------------|
| Voller Name des einzigen oder ursprünglichen Erfinders:<br><b>Dr. HANNS JUERGEN SCHWARZBAUER</b> |                           | Full name of sole or first inventor:<br><b>Dr. HANNS JUERGEN SCHWARZBAUER</b> |                          |
| Unterschrift des Erfinders<br><i>Dr. Hanns J. Schwarzbauer</i>                                   | Datum<br><i>7.12.2001</i> | Inventor's signature<br><i>Dr. Hanns J. Schwarzbauer</i>                      | Date<br><i>7.12.2001</i> |
| Wohnsitz<br><b>GROEBENZELL, DEUTSCHLAND DEX</b>  |                           | Residence<br><b>GROEBENZELL, GERMANY</b>                                      |                          |
| Staatsangehörigkeit<br><b>DE</b> ✓   |                           | Citizenship<br><b>DE</b>  |                          |
| Postanschrift<br><b>EDELWEISSSTRASSE 2A</b>  |                           | Post Office Address<br><b>EDELWEISSSTRASSE 2A</b>                             |                          |
| <b>82194 GROEBENZELL</b>   |                           | <b>82194 GROEBENZELL</b>  |                          |
| Voller Name des zweiten Miterfinders (falls zutreffend):<br><b>Dr. MICHAEL TUEXEN</b>            |                           | Full name of second joint inventor, if any:<br><b>Dr. MICHAEL TUEXEN</b>      |                          |
| Unterschrift des Erfinders<br><i>Michael Tuexen</i>  | Datum<br><i>7.12.2001</i> | Second inventor's signature<br><i>Michael Tuexen</i>                          | Date<br><i>7.12.2001</i> |
| Wohnsitz<br><b>MUENCHEN, DEUTSCHLAND DEX</b>   |                           | Residence<br><b>MUENCHEN, GERMANY</b>   |                          |
| Staatsangehörigkeit<br><b>DE</b> ✓   |                           | Citizenship<br><b>DE</b>  |                          |
| Postanschrift<br><b>GASPARISTR.8</b>   |                           | Post Office Address<br><b>GASPARISTR.8</b>                                    |                          |
| <b>81479 MUENCHEN</b>  |                           | <b>81479 MUENCHEN</b>   |                          |

(Bitte entsprechende Informationen und Unterschriften im Falle von dritten und weiteren Miterfindern angeben).

(Supply similar information and signature for third and subsequent joint inventors).

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